CLAIMS

What is claimed is:

5   1. A method to provide an arriving wireless device which is proximate to a plurality other wireless devices in a plurality of ad hoc networks, with a network discovery menu to enable the arriving device to selectively join one of the ad hoc networks, comprising:

determining that a wireless device is an ad hoc network information provider member of a local ad hoc network;

10   updating a service record in the wireless device which includes a description of a characteristic of the local ad hoc network;

determining that the wireless device is an arriving device;

searching for remote devices by the wireless device when it is an arriving device;

accessing service records from a plurality of ad hoc network information provider devices

15   in a plurality of remote ad hoc networks, by the wireless device when it is an arriving device; and

forming a network discovery menu including a plurality of descriptions of characteristics of the plurality of ad hoc networks derived from said accessed service records, by the wireless device when it is an arriving device.

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2. The method of claim 1, wherein said searching which further comprises:

selectively searching for remote devices having a specified class of device characteristic.

3. The method of claim 1, wherein said searching which further comprises:

25   selectively searching for remote devices having a specified service class.

4. The method of claim 1, wherein said searching which further comprises:

selectively searching for remote devices having a specified service attribute.

30   5. The method of claim 1, which further comprises:

determining received signal characteristics of devices in said remote ad hoc networks, by the wireless device when it is an arriving device; and

ranking said plurality of descriptions in said network discovery menu according to said signal characteristics, by the wireless device when it is an arriving device.

6. The method of claim 1, which further comprises:

associating with each of said plurality of descriptions in said network discovery menu, corresponding information about accessing each respective remote ad hoc network.

7. The method of claim 1, wherein said updating step further comprises:

determining that the wireless device is a master device in said local ad hoc network; and

forwarding new data to an ad hoc network information provider device in said local ad hoc network.

8. The method of claim 1, wherein said updating step further comprises:

determining that the wireless device is not an ad hoc network information provider device in said local ad hoc network; and

sending updated information to a master device in the local ad hoc network to be forwarded to an ad hoc network information provider device in the ad hoc network.

9. The method of claim 1, which further comprises:

determining that the wireless device is not an ad hoc network information provider device in said local ad hoc network; and

responding to an inquiry from an arriving device by providing information to access an ad hoc network information provider device in the local ad hoc network.

10. The method of claim 1, which further comprises:

displaying the network discovery menu, by the wireless device when it is an arriving device;

associating with each of said plurality of descriptions in said network discovery menu, corresponding information about accessing a master device in each respective remote ad hoc network;

paging a master device corresponding to a selected one of said plurality of descriptions; and

joining the respective remote ad hoc network of said paged master device.

5   11. A method to provide a network discovery menu to an arriving wireless device which is proximate to a plurality other wireless devices in a plurality of ad hoc networks, the network discovery menu to enabling the arriving device to selectively join one of the ad hoc networks, comprising:

determining that a wireless device is an ad hoc network information provider member of

10   a local ad hoc network;

updating a service record in the wireless device which includes a description of a characteristic of the local ad hoc network;

determining that the wireless device is an arriving device;

identifying a plurality of remote ad hoc networks, by the wireless device when it is an

15   arriving device;

accessing service records from a plurality of ad hoc network information provider devices in the plurality of remote ad hoc networks, by the wireless device when it is an arriving device; and

forming a network discovery menu including a plurality of descriptions of characteristics

20   of the plurality of ad hoc networks derived from said accessed service records, by the wireless device when it is an arriving device.

12. The method of claim 11, wherein said identifying further comprises:

selectively searching for remote devices having a specified class of device characteristic.

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13. The method of claim 11, wherein said identifying further comprises:

selectively searching for remote devices having a specified service class.

14. The method of claim 11, wherein said identifying further comprises:

30   selectively searching for remote devices having a specified service attribute.

15. The method of claim 11, which further comprises:

determining received signal characteristics of devices in said remote ad hoc networks, by the wireless device when it is an arriving device; and

ranking said plurality of descriptions in said network discovery menu according to said

5   signal characteristics, by the wireless device when it is an arriving device.

16. The method of claim 11, which further comprises:

associating with each of said plurality of descriptions in said network discovery menu, corresponding information about accessing each respective remote ad hoc network.

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17.   The method of claim 11, wherein said updating step further comprises:

determining that the wireless device is a master device in said local ad hoc network; and

forwarding new data to an ad hoc network information provider device in said local ad hoc network.

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18. The method of claim 11, wherein said updating step further comprises:

determining that the wireless device is not an ad hoc network information provider device in said local ad hoc network; and

transferring updated information to an ad hoc network information provider device in the

20   local ad hoc network.

19. The method of claim 11, which further comprises:

determining that the wireless device is not an ad hoc network information provider device in said local ad hoc network; and

25   responding to an inquiry from an arriving device by providing information to access an ad hoc network information provider device in the local ad hoc network.

20. The method of claim 11, which further comprises:

displaying the network discovery menu, by the wireless device when it is an arriving

30   device;

associating with each of said plurality of descriptions in said network discovery menu, corresponding information about accessing each respective remote ad hoc network; and

joining a respective remote ad hoc network corresponding to a selected one of said plurality of descriptions.

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21. A method to provide network information to an arriving wireless device which is proximate to a plurality other wireless devices in a plurality of ad hoc networks, the network information enabling the arriving device to selectively join one of the ad hoc networks, comprising:

10   providing an ad hoc network information provider wireless device in at least one of the plurality of ad hoc networks;

storing in the ad hoc network information provider, records that characterize the ad hoc network of which it is a member; and

sending said records from the ad hoc network information provider to an arriving 15 wireless device.

22. The method of claim 21, wherein the wireless devices use a IEEE 802.11 Wireless LAN standard.

23. The method of claim 21, wherein the wireless devices use the Bluetooth standard.

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24. The method of claim 21, wherein the wireless devices use the Infrared Data Association (IrDA) standard.

25   25. The method of claim 21, wherein the wireless devices use the Digital Enhanced Cordless Telecommunications (DECT) standard.

26. The method of claim 21, wherein the wireless devices use the Shared Wireless Access Protocol (SWAP) standard.

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27. The method of claim 21, wherein the wireless devices use the IEEE 802.15 Wireless Personal Area Network (WPAN) standard.

28. The method of claim 21, wherein the wireless devices use the High Performance Radio Local Area Network (HIPERLAN) standard.

29. The method of claim 21, wherein the wireless devices use the Multimedia Mobile Access Communication (MMAC) Systems standard.

30. A method to provide network information to an arriving wireless device which is proximate to a plurality other wireless devices in a plurality of ad hoc networks, the network information enabling the arriving device to selectively join one of the ad hoc networks, comprising:

   providing an ad hoc network information provider wireless device in at least one of the plurality of ad hoc networks;

   storing in the ad hoc network information provider, records that characterize the ad hoc network of which it is a member;

   updating said records in the ad hoc network information provider by receiving updated information from other wireless devices in the ad hoc network of which it is a member; and

   sending said records from the ad hoc network information provider to an arriving wireless device.

31. A method to provide an arriving wireless device which is proximate to a plurality other wireless devices in a plurality of ad hoc networks, with a network discovery menu to enable the arriving device to selectively join one of the ad hoc networks, comprising:

   sending with an arriving wireless device, inquiry signals to remote wireless devices;

   receiving with the arriving wireless device, addresses of a plurality of ad hoc network information provider devices in a plurality of remote ad hoc networks;

   accessing with the arriving wireless device, service records from the plurality of ad hoc network information provider devices in a plurality of remote ad hoc networks;

   determining with the arriving wireless device, received signal characteristics of devices in said remote ad hoc networks;

   ranking with the arriving wireless device, information from said service records according to said signal characteristics; and

forming with the arriving wireless device, a network discovery menu including information from said service records, ranked according to said signal characteristics.

32. The method of claim 31, wherein said wireless devices are embodied in the Bluetooth Standard.

33. The method of claim 31, wherein said wireless devices are embodied in the IEEE 802.11 Wireless LAN Standard.

34. A method to provide an arriving wireless device which is proximate to a plurality other wireless devices in a plurality of ad hoc networks, with a network discovery menu to enable the arriving device to selectively join one of the ad hoc networks, comprising:

receiving with an arriving wireless device, beacon signals from a plurality of ad hoc networks, including addresses of respective ad hoc network information providers in said networks;

accessing with the arriving wireless device, service records from the plurality of ad hoc network information provider devices in a plurality of remote ad hoc networks;

determining with the arriving wireless device, received signal characteristics of devices in said remote ad hoc networks;

ranking with the arriving wireless device, information from said service records according to said signal characteristics; and

forming with the arriving wireless device, a network discovery menu including information from said service records, ranked according to said signal characteristics.

35. The method of claim 34, wherein said wireless devices are embodied in the IEEE 802.11 Wireless LAN Standard.

36. The method of claim 34, wherein said wireless devices are embodied in the HIPERLAN Type 2 Wireless LAN Standard.

37. A method to provide an arriving wireless device which is proximate to a plurality other wireless devices in a plurality of ad hoc networks, with a network discovery menu to enable the arriving device to selectively join one of the ad hoc networks, comprising:

providing in an arriving wireless device, a default address for at least one ad hoc network information provider wireless devices in a respective one of a plurality of ad hoc networks;

accessing with the arriving wireless device, service records from the at least one ad hoc network information provider device, using said default address;

determining with the arriving wireless device, received signal characteristics of devices in said plurality of ad hoc networks;

ranking with the arriving wireless device, information from said service records according to said signal characteristics; and

forming with the arriving wireless device, a network discovery menu including information from said service records, ranked according to said signal characteristics.

38. The method of claim 37, wherein said wireless devices are embodied in the Bluetooth Standard.

39. The method of claim 37, wherein said wireless devices are embodied in the IEEE 802.11 Wireless LAN Standard.

40. The method of claim 37, wherein said wireless devices are embodied in the HIPERLAN Type 2 Wireless LAN Standard.

41. A system to provide a network discovery menu to an arriving wireless device which is proximate to a plurality other wireless devices in a plurality of ad hoc networks, the network discovery menu enabling the arriving device to selectively join one of the ad hoc networks, comprising:

a processor for determining that a wireless device is an ad hoc network information provider member of a local ad hoc network;

a memory coupled to the processor, for updating a service record in the wireless device which includes a description of a characteristic of the local ad hoc network;

said processor determining that the wireless device is an arriving device, searching for remote devices by the wireless device when it is an arriving device, and accessing service records from a plurality of ad hoc network information provider devices in a plurality of remote ad hoc networks; and

5   an interface for forming a network discovery menu including a plurality of descriptions of characteristics of the plurality of ad hoc networks derived from said accessed service records.

42. The system of claim 41, which further comprises:

said processor selectively searching for remote devices having a specified class of device

10   characteristic.

43. The system of claim 41, which further comprises:

said processor selectively searching for remote devices having a specified service class.

15   44. The system of claim 41, which further comprises:

said processor selectively searching for remote devices having a specified service attribute.

45. The system of claim 41, which further comprises:

said processor determining received signal characteristics of devices in said remote ad

20   hoc networks and ranking said plurality of descriptions in said network discovery menu according to said signal characteristics.

46. The system of claim 41, which further comprises:

25   said interface associating with each of said plurality of descriptions in said network discovery menu, corresponding information about accessing each respective remote ad hoc network.

47. The system of claim 41, which further comprises:

said processor determining that the wireless device is a master device in said local ad hoc network and forwarding new data to an ad hoc network information provider device in said local ad hoc network.

5   48. The system of claim 41, which further comprises:

said processor determining that the wireless device is not an ad hoc network information provider device in said local ad hoc network and sending updated information to a master device in the local ad hoc network to be forwarded to an ad hoc network information provider device in the ad hoc network.

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49. The system of claim 41, which further comprises:

said processor determining that the wireless device is not an ad hoc network information provider device in said local ad hoc network and responding to an inquiry from an arriving device by providing information to access an ad hoc network information provider device in the local ad hoc network.

50. The system of claim 41, which further comprises:

said interface displaying the network discovery menu, by the wireless device when it is an arriving device and associating with each of said plurality of descriptions in said network discovery menu, corresponding information about accessing a master device in each respective remote ad hoc network; and

said processor paging a master device corresponding to a selected one of said plurality of descriptions.

25   51. A system to provide network information to an arriving wireless device which is proximate to a plurality other wireless devices in a plurality of ad hoc networks, the network information enabling the arriving device to selectively join one of the ad hoc networks, comprising:

a processor in an ad hoc network information provider wireless device in at least one of

30   the plurality of ad hoc networks;

a memory coupled to the processor, for storing in the ad hoc network information provider, records that characterize the ad hoc network of which it is a member; and

a radio coupled to the processor, for sending said records from the ad hoc network information provider to an arriving wireless device.

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52. The system of claim 51, wherein the wireless devices use a IEEE 802.11 Wireless LAN standard.

53. The system of claim 51, wherein the wireless devices use the Japanese 3rd Generation

10   (3G) wireless standard.

54. The system of claim 51, wherein the wireless devices use the Infrared Data Association (IrDA) standard.

15   55. The system of claim 51, wherein the wireless devices use the Digital Enhanced Cordless Telecommunications (DECT) standard.

56. The system of claim 51, wherein the wireless devices use the Shared Wireless Access Protocol (SWAP) standard.

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57. The system of claim 51, wherein the wireless devices use the IEEE 802.15 Wireless Personal Area Network (WPAN) standard.

58. The system of claim 51, wherein the wireless devices use the High Performance

25   Radio Local Area Network (HIPERLAN) standard.

59. The system of claim 51, wherein the wireless devices use the Multimedia Mobile Access Communication (MMAC) Systems standard.

30   60. A system to provide network information to an arriving wireless device which is proximate to a plurality other wireless devices in a plurality of ad hoc networks, the network

information enabling the arriving device to selectively join one of the ad hoc networks, comprising:

a processor in an ad hoc network information provider wireless device in at least one of the plurality of ad hoc networks;

5   a memory coupled to the processor, for storing in the ad hoc network information provider, records that characterize the ad hoc network of which it is a member;

said memory updating said records in the ad hoc network information provider by receiving updated information from other wireless devices in the ad hoc network of which it is a member; and

10   a radio coupled to the processor, for sending said records from the ad hoc network information provider to an arriving wireless device.

61. A computer program product to provide a network discovery menu to an arriving wireless device which is proximate to a plurality other wireless devices in a plurality of ad hoc networks, the network discovery menu to enabling the arriving device to selectively join one of the ad hoc networks, comprising:

a computer readable medium;

program code in said computer readable medium for determining that a wireless device is an ad hoc network information provider member of a local ad hoc network;

program code in said computer readable medium for updating a service record in the wireless device which includes a description of a characteristic of the local ad hoc network;

program code in said computer readable medium for determining that the wireless device is an arriving device;

program code in said computer readable medium for searching for remote devices by the wireless device when it is an arriving device;

program code in said computer readable medium for accessing service records from a plurality of ad hoc network information provider devices in a plurality of remote ad hoc networks, by the wireless device when it is an arriving device; and

program code in said computer readable medium for forming a network discovery menu including a plurality of descriptions of characteristics of the plurality of ad hoc networks derived from said accessed service records, by the wireless device when it is an arriving device.

62. A computer program product to provide a network discovery menu to an arriving wireless device which is proximate to a plurality other wireless devices in a plurality of ad hoc networks, the network discovery menu to enabling the arriving device to selectively join one of

5 the ad hoc networks, comprising:

a computer readable medium;

program code in said computer readable medium, for providing ad hoc network information provider functions in a wireless device in at least one of the plurality of ad hoc networks;

10 program code in said computer readable medium, for storing in the wireless device, records that characterize the ad hoc network of which it is a member;

program code in said computer readable medium, for updating said records in the wireless device by receiving updated information from other wireless devices in the ad hoc network of which it is a member; and

15 program code in said computer readable medium for sending said records from the wireless device to an arriving wireless device.

63. A method to provide an arriving wireless device which is proximate to a plurality other wireless devices in a plurality of ad hoc networks, with a network discovery menu to

20 enable the arriving device to selectively join one of the ad hoc networks, comprising:

searching with an arriving wireless device, for remote wireless devices;

accessing with the arriving wireless device, service records from a plurality of ad hoc network information provider devices in a plurality of remote ad hoc networks;

determining with the arriving wireless device, received signal characteristics of devices in

25 said remote ad hoc networks;

ranking with the arriving wireless device, information from said service records according to said signal characteristics; and

forming with the arriving wireless device, a network discovery menu including information from said service records, ranked according to said signal characteristics.

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64. The method of claim 63, wherein said ranking is by Bit Error Rate accumulated over time.

65. The method of claim 63, wherein said ranking is by Packet Error Rate accumulated over time.

66. The method of claim 63, wherein said ranking is by received signal strength.

67. The method of claim 63, wherein said ranking is by link quality measurements.

68. The method of claim 63, wherein said ranking is by continuous-wave interference.

69. The method of claim 63, wherein said ranking is by co-channel interference.

70. The method of claim 63, wherein said ranking is by clear channel assessment.

71. The method of claim 63, wherein said ranking is by collisions per unit time.

72. The method of claim 63, wherein said ranking is by retry counts.

73. The method of claim 63, wherein said ranking is by, frames canceled per unit time.

74. A method to provide an arriving wireless device which is proximate to a plurality other wireless devices in a plurality of ad hoc networks, with a network discovery menu to enable the arriving device to selectively join one of the ad hoc networks, comprising:
    searching for remote wireless devices with a wireless device;
    attempting to access a service record from a found device to determine if the found device has information about an ad hoc network information provider device;
    receiving an indication from the found device that it has no information about an ad hoc network information provider device; and
    listing the found device in a network discovery menu.

75. A method to provide an arriving wireless device which is proximate to a plurality other wireless devices in a plurality of ad hoc networks, with a network discovery menu to enable the arriving device to selectively join one of the ad hoc networks, comprising:

searching for remote wireless devices with an arriving wireless device;

accessing with the arriving wireless device, service records from a plurality of ad hoc network information provider devices in a plurality of remote ad hoc networks;

determining with the arriving wireless device, received signal characteristics of devices in said remote ad hoc networks;

ranking with the arriving wireless device, information from said service records according to said signal characteristics;

forming with the arriving wireless device, a network discovery menu including information from said service records, ranked according to said signal characteristics;

attempting to access with the arriving wireless device, a service record from a found device to determine if the found device has information about an ad hoc network information provider device;

receiving with the arriving wireless device, an indication from the found device that it has no information about an ad hoc network information provider device; and

listing the found device in said network discovery menu.

76. A method to provide network information to an arriving wireless device which is proximate to a plurality other wireless devices in a plurality of ad hoc networks, the network information enabling the arriving device to selectively join one of the ad hoc networks, comprising:

providing an ad hoc network information provider wireless device in at least one of the plurality of ad hoc networks;

storing in the ad hoc network information provider, records that characterize the ad hoc network of which it is a member;

answering inquiry signals from an arriving wireless device, including an address of the ad hoc network information provider;

receiving a request from the arriving wireless device for said records; and

sending said records from the ad hoc network information provider to the arriving wireless device to enable the arriving wireless device to form a network discovery menu including information from said service records.

5   77. The method of claim 76, wherein said wireless devices are embodied in the Bluetooth Standard.

         78. The method of claim 76, wherein said wireless devices are embodied in the IEEE 802.11 Wireless LAN Standard.

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         79. A method to provide network information to an arriving wireless device which is proximate to a plurality other wireless devices in a plurality of ad hoc networks, the network information enabling the arriving device to selectively join one of the ad hoc networks, comprising:

15   providing an ad hoc network information provider wireless device in at least one of the plurality of ad hoc networks;

                 storing in the ad hoc network information provider, records that characterize the ad hoc network of which it is a member;

                 sending a beacon signal from the ad hoc network, including an address of the ad hoc

20   network information provider;

                 receiving a request from an arriving wireless device for said records; and

                 sending said records from the ad hoc network information provider to the arriving wireless device to enable the arriving wireless device to form a network discovery menu including information from said service records.

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         80. The method of claim 79, wherein said wireless devices are embodied in the IEEE 802.11 Wireless LAN Standard.

         81. The method of claim 79, wherein said wireless devices are embodied in the

30   HIPERLAN Type 2 Wireless LAN Standard.

82. A method to provide network information to an arriving wireless device which is proximate to a plurality other wireless devices in a plurality of ad hoc networks, the network information enabling the arriving device to selectively join one of the ad hoc networks, comprising:

5   providing a default address for an ad hoc network information provider wireless device in at least one of the plurality of ad hoc networks;

storing in the ad hoc network information provider, records that characterize the ad hoc network of which it is a member;

receiving a request for said records, addressed to said default address from an arriving

10   wireless device; and

sending said records from the ad hoc network information provider to the arriving wireless device to enable the arriving wireless device to form a network discovery menu including information from said service records.

15   83. The method of claim 82, wherein said wireless devices are embodied in the Bluetooth Standard.

84. The method of claim 82, wherein said wireless devices are embodied in the IEEE 802.11 Wireless LAN Standard.

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85. The method of claim 82, wherein said wireless devices are embodied in the HIPERLAN Type 2 Wireless LAN Standard.